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EXAMINER
LAVARIAS, ARNEL C

ART UNIT	PAPER NUMBER
2872	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/659,389	Applicant(s) MINABE ET AL.
	Examiner Arnel C. Lavarias	Art Unit 2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 1/28/05,1/25/05.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-18 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendments to the specification of the disclosure in the submission dated 1/28/05 are acknowledged and accepted. In view of these amendments, the objections to the specification in Section 2 of the Office Action dated 10/29/04 are respectfully withdrawn.

2. The amendments to Claims 3, 5, 9, and 11 in the submission dated 1/28/05 are acknowledged and accepted. In view of these amendments, the objections to the claims in Section 3 of the Office Action dated 10/29/04 are respectfully withdrawn.

Response to Arguments

3. The Applicants' arguments filed 1/28/05, as well as the contents of the interview dated 1/25/05 have been fully considered but they are not found persuasive. The Applicants argue that, with respect to Claims 1, 5, 9, the combined teachings of Kawano et al. and Psaltis et al. fail to teach or reasonably suggest an optical recording method and optical recording medium for recording a hologram, the method and medium including setting a width of a plurality of recording tracks according to the order of the diffracted light component so as to be at least larger than a spread of the Fourier transform image corresponding to a maximum spatial frequency of the signal light. The Examiner respectfully disagrees. It is noted that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800

F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this particular instance, Kawano et al. already discloses that the signal light (See 1 in Figure 4 of Kawano et al.) is generated and sent through a spatial light modulator (See 4 in Figure 4 of Kawano et al.) to modulate the signal light with information to recorded into the holographic recording medium (See 5 in Figure 4 of Kawano et al.). This modulated signal light is sent to a Fourier transforming lens (See 7 in Figure 4 of Kawano et al.), and the resulting Fourier transformed signal beam is sent to the holographic recording medium, where this beam is intersected with a reference beam to generate the hologram to be recorded into the recording medium. Kawano et al. in particular discloses that the Fourier transformed signal beam is passed through a spatial filter (See 20 in Figure 4 of Kawano et al.) to selectively allow only low order diffracted light components to impinge onto the recording medium (See for example Figure 3A, 6A; 20 in Figure 4; col. 3, line 65-col. 5, line 15 of Kawano et al.). Thus, width of the recording spot on the recording hologram will be the size of the spatially filtered, Fourier transformed signal beam. Although Kawano et al. does not specifically discuss setting a width of a plurality of recording tracks according to the order of the diffracted light component so as to be at least larger than a spread of the Fourier transform image corresponding to a maximum spatial frequency of the signal light, Psaltis et al. discloses that holographic information may be recorded in a plurality of tracks on the recording medium (See for example Figure 7 of Psaltis et al.), wherein the tracks are arranged in a direction crossed at right angles with a scanning direction of the recording spot in the recording layer. Further, the width of each track may be set, in cases where radial multiplexing is not required, such that it is at least

as wide or just slightly larger than the width of the spatial intensity distribution of the light, i.e. the spread of the Fourier transform image in the light, to be recorded onto the recording medium (See 100, 102, 104, 'TRACK N' in Figure 7 of Psaltis et al.), i.e. '...the signal and reference beams intersect inside the disk **38** by the width of one track (i.e., by the width of one beam spot).' (See Figures 7, 17; col. 7, lines 1-16; col. 13, lines 9-16 of Psaltis et al.). Thus, from the combined teachings of Kawano et al. and Psaltis et al., one of ordinary skill in the art would known to set a width of a plurality of recording tracks according to the order of the diffracted light component so as to be at least larger than a spread of the Fourier transform image corresponding to a maximum spatial frequency of the signal light.

4. Claims 1-18 are again rejected as follows.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 5-10, 14, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. (U.S. Patent No. 6317404), of record, in view of Psaltis et al. (U.S. Patent No. 5987112), of record.

Kawano et al. discloses an optical recording method and optical recording medium for recording a hologram (See Figure 4), wherein a recording spot is formed by intersecting

reference light (See 2 in Figure 4) with signal light (See 1 in Figure 4) in which at least one of amplitude, a phase, and a polarization state (See 4 in Figure 4; col. 5, lines 52-58) has been spatially modulated according to information and a Fourier transform has been carried out with a lens system (See 7 in Figure 4), the recording spot is scanned and the hologram is recorded in a recording layer in an optical recording medium (See Figure 8), the recording method and medium comprising forming the recording spot by selectively using zero-order to low-order diffracted light components of a Fourier transform image of the signal light (See for example Figure 3A, 6A; 20 in Figure 4; col. 3, line 65-col. 5, line 15); and scanning the recording spot. Kawano et al. further discloses the reference light being a spherical reference wave and a hologram being multiply recorded by shift multiplexing (See Figure 8; col. 1, line 31-col. 2, line 36); the orders of the diffracted light components in the Fourier transform image are zero order through at least third order (See Figure 2; col. 4, lines 48-55); the optical recording medium being substantially in the form of a disk (See 35 in Figure 8); and the plurality of recording tracks being separated by a region where at least one of optical transmittance, reflectivity, and optical anisotropy is different from that of the recording track region (See col. 6, lines 14-25). Kawano et al. lacks setting a width of a plurality of recording tracks, which are arranged in a direction crossed at right angles with a scanning direction of the recording spot in the recording layer, according to the order of the diffracted light component so as to be at least larger than a spread of the Fourier transform image corresponding to a maximum spatial frequency of the signal light. However, Psaltis et al. teaches a conventional holographic recording and reconstruction system (See for example Figure 5) for disk-

shaped recording media, wherein the holographic information is recorded in a plurality of tracks on the recording medium (See for example Figure 7). The tracks are arranged in a direction crossed at right angles with a scanning direction of the recording spot in the recording layer. Additionally, the track width is set such that it is at least as wide or just slightly larger than the width of the spatial intensity distribution of the light, i.e. the spread of the Fourier transform image in the light, to be recorded onto the recording medium (See 100, 102, 104, 'TRACK N' in Figure 7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to set a width of a plurality of recording tracks, which are arranged in a direction crossed at right angles with a scanning direction of the recording spot in the recording layer, according to the order of the diffracted light component so as to be at least larger than a spread of the Fourier transform image corresponding to a maximum spatial frequency of the signal light, as taught by Psaltis et al., in the recording method and medium of Kawano et al., for the purpose of reducing or eliminating cross-talk from adjacent holograms recorded in adjacent tracks.

7. Claims 2-3, 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. in view of Psaltis et al.

Kawano et al. in view of Psaltis et al. discloses the invention as set forth above in Claims 1 and 9, except for a width of the recording track satisfying a relationship expressed by $\frac{\lambda F}{d} \le w \le \frac{n\lambda F}{d}$, or more specifically $w \approx \frac{m\lambda F}{d}$. However, Kawano et al. additionally teaches that the spread of the Fourier transform image corresponding to the maximum spatial frequency of the signal light should ideally be approximately

$0 \leq \xi \leq\approx \frac{n\lambda F}{d}$ (See col. 3, line 44-col. 5, line 15). Since the track width is ideally at least the same size or just slightly larger than the spread of the Fourier transform image, it would have been apparent to similarly have the width of the track be $0 \leq w \leq\approx \frac{n\lambda F}{d}$. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the width of the recording track satisfy a relationship expressed by $\frac{\lambda F}{d} \leq w \leq \frac{n\lambda F}{d}$, or more specifically $w \approx \frac{m\lambda F}{d}$, as taught by Kawano et al., in the recording method and medium of Kawano et al. in view of Psaltis et al., for the purpose of recording the holographic information in the smallest possible area, while maintaining a high signal-to-noise ratio for reading the holographic information out from the medium.

8. Claims 4 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. in view of Psaltis et al. as applied to Claims 1, 9 above, and further in view of Curtis et al. (U.S. Patent No. 6163391), of record.

Kawano et al. in view of Psaltis et al. discloses the invention as set forth above in Claims 1 and 9, except for the width of the recording track satisfying a relationship expressed by the following formula where, in the optical recording medium, a surface on a lens side of the recording layer is arranged forward from a focal position of the lens system: $w \approx m\left(\frac{\lambda F}{d} + \left|\frac{1}{2F} - \frac{\lambda}{d}\right| y\right)$. However, Curtis et al. teaches a conventional method and apparatus for recording holographic data onto a recording medium (See for example Figure 1), wherein the recording medium may be placed in the path of the reference and

object beam in such a manner that the recording surface is forward from the focal position of the Fourier transform lens (See 440, 427 in Figure 13). Additionally, given that the dimensions of the beam width of the object beam at the Fourier plane, the dimensions of the beam width of the object beam prior to focusing with the Fourier transform lens, the distance from the Fourier transform lens to the front surface of the recording medium, and the distance from the front surface of the recording medium to the focal position of the Fourier transform lens are all known, one of ordinary skill would have been able to perform the simple geometric calculations, and in particular calculations using the geometric concept of similar triangles, to determine the beam width, and hence the track width at the recording medium, to be

$w \approx m\left(\frac{\lambda F}{d} + \left|\frac{1}{2F} - \frac{\lambda}{d}\right| y\right)$. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the width of the recording track satisfy a relationship expressed by the following formula where, in the optical recording medium, a surface on a lens side of the recording layer is arranged forward from a focal position of the lens system: $w \approx m\left(\frac{\lambda F}{d} + \left|\frac{1}{2F} - \frac{\lambda}{d}\right| y\right)$, as taught by Curtis et al., in the recording method and medium of Kawano et al. in view of Psaltis et al., for the purpose of reducing or mitigating the sensitivity of the recording medium to shrinkage.

9. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. in view of Psaltis et al.

Kawano et al. in view of Psaltis et al. discloses the invention as set forth above in Claim 9, except for the plurality of recording tracks being provided in the form of either

concentric circles or a spiral. However, it is well known in the art of holographic recording to record holographic data in the recording medium using recording tracks that are either in the form of concentric circles or in the form of a spiral. For example, Psaltis et al. additionally teaches that the holographic information to be recorded onto the recording medium is arranged in circular tracks (See for example Figure 7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the plurality of recording tracks be provided in the form of either concentric circles or a spiral in the recording method and medium of Kawano et al. in view of Psaltis et al., to optimize the use of the available storage space of the holographic recording medium during multiplex recording.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. in view of Psaltis et al.

Kawano et al. in view of Psaltis et al. discloses the invention as set forth above in Claim 9, except for the optical recording medium being substantially in the form of a card. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the optical recording medium be substantially in the form of a card, since it has been held that a mere change in shape of an element is generally recognized as being within the level of ordinary skill in the art when the change in shape is not significant to the function of the combination. Further, one would have been motivated to select the shape of a card to provide compatibility with existing recordable media technologies, such as identification cards, credit cards, licenses, etc.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 9:30 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ACL

Arnel C. Lavarias
4/5/05

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